SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR

Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : Electrical Measurements (19EE0213) **Course & Branch**: B.Tech– EEE

Year &Sem: III-B.Tech& I-Sem. **Regulation:** R19

UNIT –I

MEASURING INSTRUMENTS

1. (a) Define the terms "Indicating instruments", "Recording instruments" and integrating Instruments". Give examples of each case. [L1][CO1][6M]

   (b) List the advantages and dis advantages of PMMC type instruments. [L2][CO1][6M]

2. (a) Explain the construction and working of permanent magnet moving coil instruments. [L2[CO1][6M]

   (b) A moving coil instrument gives a full -scale deflection of 10mA when the potential across its terminals is 100mV. Calculate shunt resistance for a full -scale deflection corresponding to 100 A. [L3][CO1][6M]

3. Design an Aryton shunt to provide an ammeter with the current ranges 1 A, 5 A and 10 A. The basic meter resistance is 50 ohm and full scale deflection current is 1 mA [L3][CO1][12M]

4. What are the different types of damping systems? Explain them with neat diagram. [L1][CO1][12M]

5. (a) How the electrical measuring instruments are classified? [L1][CO1][6M]

   (b) Discuss about errors and compensations of measuring instruments. [L2][CO1][6M]

6 .(a)Derive an expression for the Deflecting torque in MI type instruments [L3][CO1][6M]

   (b) List the advantages & disadvantages of MI type instruments [L1][CO1][6M]

7. (a) Describe the construction and working of attraction type MI instrument? [L2[CO1]][6M]

   (b) A moving coil instrument has a resistance of 10 ohm and gives a full scale deflection When carrying 50mA. Show how it can be adopted to measure voltage upto 750 V and current of 100 A. [L3][CO1][6M]

8. How do you extend the range of an Ammeter? Explain Aryton Shunt with diagram. [L1][CO1][12M]

9. Explain briefly Quadrant type Electrostatic voltmeter meter. Explain Heterostatic or Idiostatic Connections [L2][CO1][12M]

10. Explain the working of Kelvin Absolute Voltmeter. What are the advantages and disadvantages of Electrostatic Instruments? [L2][CO1][12M]

UNIT- II

DC BRIDGES and AC BRIDGES

1. (a) Draw the circuit diagram of a Wheatstone bridge and derive the condition for balance. [L4] [CO2] [6M]

   (b) The four arms of Wheatstone bridge as follows: AB = 5KΩ ; BC =? ; CD = 10Ω ; DA = 2KΩ .What should be the resistance in the arm for no current through the Galvanometer? [L4] [CO2] [6M]

2. Explain how insulation resistance of a cable can be measured with a help of Loss of charge method? [L2] [CO2] [12M]

3. (a) Draw the circuit of a Kelvin's double bridge used for measurement of low resistances. Derive the condition for balance. [L4] [CO2] [6M]

   (b) Explain classification of resistances. [L2] [CO2] [6M]

4. An ac bridge circuit working at 1 KHz has its arms as follows:
   Arm AB: 0.2 µf capacitance
   Arm BC: 500 ohm resistor
   Arm CD: unknown impedance
   Arm DA: 300 ohm resistor in parallel with 0.1µf capacitor
   Find R and L or C constants of the Arm CD considering it as a series circuit.
   [L4] [CO2] [12M]

5. Explain how Wien's bridge can be used for experimental determination of frequency. Derive the expression for frequency in terms of bridge parameters. [L2, L4] [CO2] [12M]

6. (a) Explain the features of De-Sauty's Bridge with a neat sketch. [L2] [CO2] [6M]

   (b) List the advantages and disadvantages of Maxwell's Bridge. [L1] [CO2] [6M]

7. Explain the construction and working of Anderson Bridge with suitable diagrams. [L2] [CO2] [12M]

8. Derive the general balance equation of DC and AC Bridges with suitable diagrams. What are the balance condition equations in polar and Rectangular forms? [L4] [CO2] [12M]

9. Explain substitution method and potentiometer method for measuring medium resistances. [L2] [CO2] [12M]

10. Explain how the inductance is measured in terms of known capacitance using Maxwell's bridge [L2] [CO2] [12M]

UNIT – III

MEASUREMENT OF POWER AND ENERGY

1. Explain the constructional details of electro dynamometer type wattmeter with a neat sketch. [L2][CO3][12M]

2. (a) Derive the torque equation for electro dynamo meter type wattmeter. [L4] [CO3] [6M]

   (b) Explain stray magnetic field errors in electro dynamometer type wattmeter. [L2][CO3][6M]

3. (a) A single phase kilo watt hour meter makes 500 revolutions per kilo watt hour. It is found on testing as making 40 revolutions in 58.1 seconds at 5KW full load. Find the percentage error. [L4] [CO3] [6M]

   (b) Explain driving system , moving system and braking system in a single phase induction type energy meter. [L2] [CO3] [6M]

4. (a) Explain the measurement of LPF and UPF. [L2] [CO3] [6M]

   (b) Explain creeping and its compensation in 1-Ø induction type energy meter. [L2][CO3][6M]

5. (a) Explain the friction compensation in single phase induction type Energy Meter. [L2] [CO3] [6M]

   (b). A 50A , 230 V meter on full load test makes 61 revolutions in 37 seconds . If the normal disc speed is 520 revolutions per Kwh , find the percentage error . [L4] [CO3] [6M]

6. Explain the construction of Two element and Three element dynamometer wattmeter. [L2] [CO3] [12M]

7. (a) Explain errors caused by vibration of moving system electro dynamometer type wattmeter. [L2] [CO3] [6M]

   (b) Explain the advantages and disadvantages of single phase Induction type Energy meter. [L2] [CO3] [6M]

8. Explain with a neat sketch the construction and working of a single-phase Dynamometer type Wattmeter. [L2] [CO3] [12M]

9. a) Explain the working of 2 element energy meter with a neat diagram. [L2] [CO3] [6M]

   b) Discuss the errors of single phase energy meter. [L2] [CO3] [6M]

10. With a neat construction diagram, explain the operation of single phase induction type energy Meters [L2] [CO3] [12M]

UNIT –IV

INSTRUMENT TRANSFORMERS AND TRANSDUCER

1. (a) Discuss C T and P T. [L2] [CO4] [6M]

(b) Why secondary of C.T should not be open? [L1] [CO4] [6M]

2. Explain the construction of (i) Current transformer (ii) Potential transformer. [L2] [CO4] [12M]

3. Draw the phasor diagram of PT. Derive the expression for its transformation ratio and phase angle errors. [L3] [CO4] [12M]

4. Draw the equivalent circuit and phasor diagram of CT. Derive its transformation ratio. [L2] [CO4] [12M]

5. From the fundamentals, derive the expressions for actual transformation ratio and phase angle of the potential transformer. [L3] [CO4] [12M]

6 . (a) What are the parameters to be considered in selecting a transducer for a particular application? [L1] [CO4] [6M]

(b) Describe the working principle of thermocouples [L2] [CO4] [6M]

7. (a) Describe the construction and working of LVDT with a neat schematic [L2] [CO4] [6M]

(b) Explain the advantages of electrical transducer [L2] [CO4] [6M]

8. (a) Discuss in detail about Thermistors. [L2] [CO4] [6M]

(b) Explain about inductive displacement transducers. [L2] [CO4] [6M]

9 Describe the method for measurement of temperature with use of

a) RTD b) Thermistors c) IC Sensor [L2] [CO4] [12M]

10. a) what is a transducer? Explain classification of transducers [L1] [CO4] [6M]
b) Describe the principle and operation of capacitive transducer for angular displacement measurement [L1] [CO4] [6M]

UNIT – V

MAGNETIC MEASUREMENTS

1. Describe the construction and working of a moving coil ballistic galvanometer. [L4] [CO5] [12M]

2. (a) Explain the construction and working principle of Flux meter with a neat diagram. [L2] [CO5] [6M]

(b) Determine leakage factor with flux meter. [L1] [CO5] [6M]

3 Explain the determination of B -H loop using method of reversals . [L2] [CO5] [12M]

4. (a) How do you measure leakage factor using Flux meter. [L1] [CO5] [6M]

(b) (b) compare flux meter and Ballistic Galvanometer [L2] [CO5] [6M]

5 . Describe the method for determination of B.H curve of a magnetic material using:

(i) Method of Reversals (ii) Six point method. [L2] [CO5] [6M]

6. Describe briefly how the following measurements can be made with the use of CRO

(i) Frequency. (ii) Phase angle. (iii) voltage. [L2] [CO6] [12M]

7. (a) List the advantages & applications of C R O. [L1] [CO6] [6M]

(b) Draw a neat figure and explain the working of a C R O. [L1, L2] [CO6] [6M]

8. (a) Explain the functions of time base generator in a CRO [L2] [CO6] [6M]

(b) Draw the Lissajous patterns. [L4] [CO6] [6M]

9. (a) Discuss how the measurement of frequency and phase is done with the help of CRO. [L2] [CO6] [6M]

(b) Describe the functions of attenuators in CRO. [L2] [CO6] [6M]

10. Explain the internal structure of CRT with a neat diagram [L2] [CO6] [12M]

Prepared by:**R. Lakshmi**